NOISE LEVELS AND QUALITY OF LIVELIHOODS IN RESIDENTIAL NEIGHBOURHOODS OF PORT HARCOURT METROPOLIS, NIGERIA

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ABSTRACT

The study examined the noise levels in the residential neighbourhoods of Port Harcourt Metropolis, Nigeria with a view to considering the quality of livelihood that the residents are being subjected to. The study made use of 891 copies of questionnaire to elicit information on the noise levels and quality of lives in selected communities namely Nkpolu/Oroworukwo, Elelenwo, Orije (Old GRA), Rumuepirikom, Choba, Rukpoku, Orominieke (D-Line), Eliozu, Rukpakwolusi, Agip Estate, and Iwofe. The digital sound level meter was used to measure noise levels in the morning (7:00am -8:30am), afternoon (12:00 pm-2:30 pm) and evening (4:00 pm-6:30pm). Descriptive statistics in form of mean noise levels and percentages; and inferential statistics which included the Analysis of Variance was used to determine the significant variations in the noise levels among the residential neighbourhoods at $p<0.05$ significant levels. Findings revealed that highest mean noise level was found in Elelenwo (70.1 dB(A)) while the lowest was found in Orije (Old GRA) (57.5 dB(A)). However, on Sundays, the least noise level (65.3 dB(A)) was experienced while the highest was generated on Saturdays (66.0 dB(A)). The noise level was generally higher than the WHO standard noise level in the residential neighbourhoods. The use of generator set (56%) was a major source of high noise levels in the residential neighbourhoods. Findings revealed that 73.6% agreed that there was no awareness of the effects of high noise level on human health. Also, 64.0% were not satisfied with the noise level in the residential neighbourhoods while 94.1% agreed that the committers of noise pollution were not prosecuted. There was significant variation in the noise levels among the selected communities ($F= 42.439$, $p=0.000$). The study therefore recommended among others that massive enlightenment campaigns on the adverse effects of noise pollution should be regularly carried out by government and other institutional agencies.

Keywords: Noise levels, Human health, Sound meter, Residential neighbourhood.

INTRODUCTION

Man has since creation desired to live in a comfortable environment; one worthy of purposeful and sustainable amenities; and having all necessary instruments of comfortable living (Makinde, 2015). Unfortunately, the aforementioned aspiration of man for desirable living environment comes to focus as illusion, due among other things to environmental pollution of all sorts. Generally, "environmental pollution is defined as the addition of any substance or form of energy (e.g. heat, sound) to the environment at a rate faster than at which the environment can accommodate it by absorbing, dispersing, or breaking it down, and that would harm humans, flora and fauna or abiotic systems" (Narayanan, 2011). The above implies that once any substance is added to the environment above the carrying capacity or tolerance rate of the environment and is not able to be defused and filtered away or recycled or at least stocked unobjectionably, pollution is said to be evident.

The major kinds of pollution vary with the propelling factors and class of environment. Suffice it to mention that unplanned urbanization characterised by sprawling together with advancement in technology, transportation and communication systems, bad environmental habits, and poor institutional control are undeniable threshold factors to various forms of pollution including noise pollution. Noise pollution is a by-product of excessive sound which is produced by the gamut of activities we engage in daily. Everyday different types of sounds are produced from different activities, which are relative to different people. This is so because as Kaushik and Kaushik (2008) posited a type of sound may not disturb someone, while at the same time may be a huge disturbance to others. This sound that is unwanted and causes disturbance and discomfort is called noise.

Environmental noise is the noise produced from all sources apart from those generated in the industrial workplace or an unwanted acoustic signal or sound dumped into the environment without regard of its adverse effect on both man and the environment, which in most cases the acoustic signal sounds are louder than normal acceptable levels (Schomer, 2001 in Oloruntoba et al., 2012; Ebeniro and Abumere (1999) in Okeke and George, 2015). The effect of noise on the human ear depends on its loudness (amplitude) and frequency of the wave (pitch) (Kaushik and Kaushik, 2008). Generally, noise pollution can be generated from stationary/point, mobile, indoor or outdoor sources. Nevertheless, specific sources of noise pollution include industrial plants; power plants; construction sites; transportation modes such as railways, airplane traffic and automobile traffic; blenders and fruit mixers at homes; emergency service sirens like ambulances, bullion vans, security vehicles, fire-fighter trucks; electricity generators; loud music and public address systems (FEPA, 1992; Kaushik and Kaushik, 2008; Oyedepo, 2012), employed by socio-political and religious activities notable of political parties, government agencies, churches and mosques.

The effects of noise pollution on humans are numerous depending on the sound intensity and length of time of exposure to the sound. These include interference with verbal communication; temporary or permanent hearing damages/loss; physiological and psychological changes; hypertension; insomnia and going to sleep late; blood pressure changes; behavioural changes; emotional changes; irritability, stress, anxiety; and reduction in working efficiency (Ugwuanyi et al., 2004, Stanfield and Matheson, 2005 in Okeke and George, 2015; Bhargawa, 2001 in Omubo-Pepple et al., 2010; Ahmed et al., 2006, Kaushik and Kaushik, 2008; Bronzaft, 2000; WHO, 2005). Noise pollution within residential neighbourhoods is a product of numerous other activities other than those normally expected, especially with the mixed and interwoven uses to which residential landuse is put, and it is important to consider all these contributing sources. FEPA (1992) reported that most industrial estates exist alongside or close to residential areas, whereas exposure to industrial and other forms of noise can induce hearing loss and other pathological changes in the affected population. Obafemi (2006) noted that noise was regarded as an ordinary unwanted sound but has in contemporary time become a nuisance which contributes immensely to the degradation of the urban environment.

The permissible noise limit for various landuse varies with nations. For instance, Indian's Central Pollution Control Board (ICPCB) committee recommended 65 dB (A) and 55 dB(A) as permissible noise limits for daytime and nighttime respectively (Kaushik and Kaushik, 2008). In Nigeria, daily noise exposure limits for workers should not exceed 90 dB(A) daily for a 8-hour working period (FEPA, 1992). Also, high levels of noise have been recorded in some of the cities of the world. For example, Nanjing in China had a magnitude of 105 dB, Rome 90 dB, New York 88 dB, Calcutta 85 dB, Mumbai 82 dB, Delhi 80 dB, Kathmandu 75

dB (Kaushik and Kaushik, 2008).

In considering the adverse effects of noise and the need for control, it is suggested by Kaushik and Kaushik (2008) that noise can be controlled by reduction in sources; use of sound absorbing silencers; planting of more trees with broad leaves; and legislation. Menkiti and Nwafor (2015) advocated the development and promotion of the concept of noise management by industries, scientists and governments as well as drawing up community and industrial noise guidelines. They added that the drawn guidelines will also offer recommendation to government for implementation such as extending and enforcing existing legislation which include community noise environmental impact assessment.

There are evidence of studies related to noise levels in Port Harcourt and elsewhere (Omubo-Pepple et al., 2010; Okeke and George, 2015; Orie, 2016; Ogobiri et al., 2014; Oloruntoba et al., 2012), however, Fadamiro and Adedeji (2014) reported that there are limited studies concerning the housing environments in developing countries. This is true considering the fact that those earlier studies paid little attention to residential landuse, whereas the worst experience of noise pollution is the human communities in densely populated areas, such as residential neighbourhoods. Thus, Purdon and Aderson (1983) noted that urban environmental noise together with air pollution, waste and crime are categorised as foremost environmental problems of urban habitation. This view was corroborated by World Health Organisation (WHO) (2005) when it asserted that noise pollution is the third most hazardous type of pollution, right after air and water pollution in big cities (WHO, 2005).

Omubo-Pepple et al. (2010) reported that noise among other effects degrade residential, social, working, and learning environments and suggested public education as a means of curbing the menace. Okeke and George (2015) employed an integrating sound level meter to measure variations in noise levels for busy road junctions/intersections, commercial, passenger loading bus stops/parks, and few residential areas in Port Harcourt Metropolis; with their findings revealing that the noise levels obtained exceeded the allowable limits recommended by WHO (1999) and ISO (1996) for all the landuse activities considered in the study. Orie (2016) examined the legal imperatives and challenges militating against the regulation of noise pollution in Nigeria in comparison with the Indian jurisprudence on noise regulation and the strategies to effectively control noise pollution and attain sustainable development.

Again, majority of the previous studies did not account for residents' perception on the issues of noise pollution in their neighbourhoods. Also, investigation of the residents' level of awareness on existence of legislations/laws on noise including its adverse effects which would have assisted in developing a platform for information sourcing, enlightenment campaigns and driving control and enforcements was neglected in the earlier reports. It is imperative to state that residential landuse accounts for the highest urban landuse distribution hence must be accorded more attention. It is against these backdrops that this study considers the imperative to undertake a comparative evaluation of the daily and spatio-temporal variations of noise levels in the residential environments of Port Harcourt Metropolis with a view to eliciting the residents' perception on their level of awareness on noise related issues, health, comfort, and satisfaction. Accordingly, these were reported wholly in order to close the lingering gaps in the existing literatures.

MATERIALS AND METHODS

This study was carried out in the residential landuse of Port Harcourt Metropolis using the descriptive survey and longitudinal research designs. Port Harcourt is located on the latitudes between latitudes between 4^{o} 44' 58.8''N and 4^{o} 56' 4.6''N and longitudes between 6^{o} 52' 7.2''E and 7^{o} 7' 37.7''E. Port Harcourt experiences a tropical humid climate with lengthy and heavy rainy seasons and very short dry seasons. The city is endowed with abundant sunshine and the average temperatures are between 25°C-28°C in the city (Ogbonna et al., 2007). Port Harcourt is dominated by low lying coastal plains, which structurally belongs to the sedimentary formation of the recent Niger Delta, with an elevation less than 15.24m (Oyegun and Adeyemo, 1999; Chiadikobi et al., 2011). Drainage of the study area is poor because of the presence of many surface water and heavy rainfall between 2000mm and 2400mm (Mmom and Fred-Nwagwu, 2013).

The target population of this study were the people living in the residential neighbourhoods within Port Harcourt Metropolis comprising of Port Harcourt City Local Government Area (PHALGA) and Obio/Akpor Local Government Area (OBALGA). Communities in PHALGA were 25 while those in OBALGA were 89 giving a total of 114 communities (National Population Commission, 1991, 1996, 2006 and 2012; Rivers State Central Statistical Agency (RSCSA), 2003). From these, 10% of each of the sample frame was selected as the sample with the aid of the simple random sampling technique using lottery method, and this gave a total of eleven (11) communities used for the study.

The sampled study locations included Nkpolu/Oroworukwo (parts of mile 3 Diobu) (C1), Elelenwo (C2), Orije (Old GRA) (C3), Rumuepirikom (C4), Choba (C5), Rukpokwu (C6), Orominike (D-Line) (C7), Eliozu (C8), Rukpakwolusi (C9), Agip Estate (C10) and Iwofe (C11). The total projected population for the 11 communities selected was 218,956 which consisted of 36,494 households. These were finally reduced to achieve the actual sample size by applying the Taro Yamane (1967) formula (Yamane,1967) to the household population of each of the communities. Thus, a total of 920 copies of questionnaire were administered to respondent in which 891 copies of the questionnaire were returned and used for the analysis. The questionnaire instrument was validated by scrutiny, review and verification by experts while its reliability was achieved by the use of test-retest method which yielded a coefficient value of 0.99.

The noise level of each of the selected residential neighbourhoods was conducted with the aid of an Integrated Precision Digital Sound Level Meter set on A-weighting which according to Onuu and Inyang (2000) is recommended by many agencies. The digital sound level meter was held with its microphone at a distance of about 1.2m above the ground. Noise level measurements were carried out three times daily for a period of eight weeks. Daily measurements were taken in the morning (7:00am -8:30am), afternoon (12:00 pm-2:30 pm) and evening (4:00 pm-6:30pm). This aided in measuring the A-weighted equivalent sound pressure level (LAeq) instantaneously for all the time periods under consideration. Both descriptive statistics and inferential statistics were used to analyze the data. The descriptive statistics were done in form of percentages and mean noise levels while inferential statistics involves the use of analysis of variance (ANOVA) to determine the significant variations in the noise levels among the residential neighbourhoods in the morning, afternoon and evening at $p<0.05$ significant levels. Also, ANOVA was used to determine the significant variation in the noise level among the days of the week at $p<0.05$ significant level. All analyses were computed using Statistical Package for the Social Sciences (SPSS) version 20.0.

Results

Spatio-Temporal Analysis of Noise Levels in Residential Neighbourhoods of Port Harcourt Metropolis

Noise levels among different communities in Port Harcourt Metropolis in different time of the day are shown in Table 1. The analysis shows that Elelenwo had mean noise level of 70.1 dB(A) which was found to be the highest in the study area. This is followed by Nkpolu/Oroworukwo (69.0 dB(A)) and Orominieke (68.3 dB(A)). Orije (Old GRA) was observed to have the least average noise level per day at 57.5 dB(A).

The analysis also showed that Orije (Old GRA) which has the lowest noise level in time period recorded 56.1 dB(A) in the morning, 56.5 dB(A) in the afternoon, 59.9 dB(A) in the evening and 57.5 dB(A) overall. While Elelenwo which has the highest noise level recorded 67.0 dB(A) in the morning, 73.4 dB(A) in the afternoon, 70.0 dB(A) in the evening and 70.1 dB(A) overall. Nevertheless, it is important to state that these measurements for the neighbourhoods exceed the recommended permissible noise limits for residential zones. For clarity, the noise standards for residential areas is 55 dB(A) for daytime and 45 dB(A) for nighttime (World Health Organization (WHO) Noise Standards, 1995; World Bank Noise Guidelines, 2004). Thus, noise pollution was prevalent in the housing environment in Port Harcourt and hence, might limit the habitability quality of the dwellings in these neighbourhoods. Noise pollution level varied significantly among the communities in the morning ($F=20.463$, $p=0.0004$); afternoon ($F=47.359$, $p=0.0001$) and evening ($F=15.054$, $p=0.0007$). Furthermore, the total noise level varied significantly among the communities ($F= 42.439$, $p=0.000$).

The daily analysis of noise in Port Harcourt Metropolis presented in Table 2 showed that noise levels was highest on Saturdays with an overall average of 66.0 dB(A) and least on Sundays with an overall average of 63.5 dB(A). Other week days also showed considerable high noise level. Findings revealed that noise was generated more in the evening hours than in the morning and afternoon except on Mondays. Sunday mornings are shown to be generally tranquil except for zones that accommodate churches. There was significant variation in the noise level among the days of the week in the study area ($F=2.446$, $p=0.024$).

Table 1: Noise levels in residential neighbourhoods of Port Harcourt Metropolis

Locations	Morning			Afternoon			Evening			Overall Average ± SD (dB)A
	Min	Max	Mean±SD (dB)A	Min	Max	Mean±SD (dB)A	Min	Max	Mean±SD (dB)A	
Nkpolu/Oroworukwo	65.1	72.9	68.7±2.45	63.6	73.8	66.8±2.54	67.1	75.4	71.5±2.25	69.0±3.06
Elelenwo	62.3	70.9	67.0±2.54	65.9	78.2	73.4±3.25	65.1	78.2	70.0±3.59	70.1±4.05
Orije OldGRA	52.5	59.3	56.1±1.98	53.4	60.1	56.5±1.98	54.6	63.2	59.9±3.14	57.5±2.93
Rumuepirikom	58.8	67.4	63.6±2.69	58.8	65.0	61.4±1.83	60.0	67.1	63.5±2.70	62.8±2.60
Choba	59.1	67.9	64.7±2.72	60.7	69.8	63.7±2.32	55.8	68.4	63.7±3.98	64.0±3.05
Rukpoku	56.8	73.0	66.3±5.16	59.8	69.0	64.5±2.96	60.5	74.1	69.4±3.41	66.8±4.36
Orominieke	54.8	76.3	70.2±5.35	61.1	69.9	66.9±2.47	56.7	75.2	68.0±5.21	68.3±4.64
Eliozu	58.3	68.1	62.8±3.34	59.2	66.7	61.4±2.10	60.0	74.3	67.5±3.06	63.9±3.86
Rukpakwolusi	57.7	65.2	60.9±2.28	59.0	61.0	59.9±0.72	60.1	69.2	65.8±2.46	62.2±3.26
Agip Estate	61.9	69.9	65.1±2.14	61.9	70.8	65.8±2.58	63.7	74.4	69.6±2.92	66.8±3.18
Iwofe	61.1	73.2	66.9±2.92	58.0	67.3	61.7±2.98	65.9	74.6	68.2±3.05	65.6±4.09
F_{cal}	**20.463**			**47.359**			**15.054**			**42.439**
F_{crit}	**1.897**			**1.897**			**1.897**			**1.852**
P value	**0.004**			**0.001**			**0.0007**			**0.000**

Table 2: Daily analysis of noise levels in residential neighbourhoods of Port Harcourt Metropolis

Days	Morning			Afternoon			Evening			Overall Mean± SD (dB)A
	Min	Max	Mean±SD (dB)A	Min	Max	Mean± SD (dB)A	Min	Max	Mean± SD (dB)A	
Monday	55.9	73.2	65.7±4.31	57.0	75.5	64.5±4.67	55.5	71.5	63.9 ±4.20	64.6±4.40
Tuesday	56.4	71.5	65.8±3.93	55.2	74.5	64.0 ±4.95	56.3	72.7	66.6 ±4.51	65.3±4.51
Wednesday	55.6	75.8	66.2±5.11	54.4	75.1	63.9 ±5.04	60.0	74.3	67.5 ±3.83	65.7±4.86
Thursday	56.2	70.5	64.3 ±3.80	53.4	74.4	62.6 ±4.34	55.8	72.9	65.9 ±4.16	64.1±4.25
Friday	57.4	75.8	66.7 ±5.04	56.8	78.2	65.0 ±5.88	54.6	71.5	70.0 ±3.55	65.8±4.91
Saturday	55.1	71.3	63.8 ±4.86	54.2	74.6	64.8 ±5.19	55.2	78.2	70.2±5.03	66.0±5.53
Sunday	52.4	68.4	60.3 ±4.07	55.5	70.4	62.0 ±3.69	58.9	75.2	68.9±4.60	63.5±5.46
F_{cal}	**2.446**									
F_{tab}	**2.119**									
P value	**0.024**									

Awareness of Noise Pollution Problems in the Residential Neighbourhoods of Port Harcourt Metropolis

Major housing and environmental problems in the residential neighbourhood

The result in Table 3 presents the housing and environmental problems encountered in the residential neighbourhoods. The analysis shows that inadequate housing facility was attested to by 25.1% of the total respondents. This is followed by overcrowding representing 17.9%; high noise level 16.6%; lack of maintenance 15.0%; inadequate neighbourhood amenities 13.4%; while poor road condition was 12.0%.This finding is similar to that of Wokekoro and Owei (2014).

Table 3: Housing and environmental problems encountered

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Inadequate housing facilities	52	10	20	20	33	12	65	4	3	2	3	224	25.1
High Noise	41	9	5	16	21	6	43	3	1	1	2	148	16.6
Poor road condition	33	7	6	15	15	8	16	3	1	2	1	107	12.0
Lack of maintenance	40	5	23	13	13	3	24	2	0	0	1	134	15.0
overcrowding	50	9	12	19	26	9	25	3	2	2	2	159	17.9
Inadequate neighbourhood amenities	38	8	10	15	18	7	16	3	2	1	1	119	13.4
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Residents' rating of noise level in the residential environment

Table 4 shows that majority of the respondents representing 35% held that the noise level in their neighbourhood is high; 33% indicate that the noise level is moderate; 13% held that the noise level is low; 11% indicate that it is very high; while 8% indicate that the noise level is very low. From this analysis it can be deduced that high noise level in the neighbourhoods is alarming considering the aggregate of all ratings in the "high continuum" (46%) in comparison with scores in the "low continuum" (21%).

Table 4: Ratings of noise level in the residential environment

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Very High	30	8	3	8	11	4	25	3	1	1	2	96	11
High	90	10	7	54	36	17	86	7	2	2	4	315	35
Moderate	90	5	18	25	58	20	55	6	5	5	4	291	33
Low	32	15	34	5	17	4	10	2	1	0	0	120	13
Very low	12	10	23	6	5	0	13	0	0	0	0	69	8
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Sources of noise within the residential neighbourhoods

Table 5 which shows the result of sources of noise within the residential environments reveals that greater number of the respondents representing 63% held that electricity generating sets are the major source of noise in their neighbourhoods while 26% indicated that automobiles were the source of noise to their environment. This corresponds with the findings of Omubo-Pepple et al. (2010) and Wokekoro and Owei (2014) which asserted that an unbearable problem in Port Harcourt is noise pollution which is majorly generated from private electricity generating sets commonly used as alternative to the irregular electricity supply. It is also observed from the study that 7.0% agreed that the source of noise to them can be attributed to various religious activities; 6% answered that the major source of noise was from social activities such as outdoor parties, political rallies etc, and 5% agreed to commercial/small industrial activities. It may be somewhat surprising to observe from this study that religious activities, notable of churches and in few instances mosques (especially on Fridays and Sundays which are the peak days of their activities occasioned by "Jumaat" prayers and "All-night and Special Thanksgiving services") generated more noise in the residential neighbourhoods than social and commercial/industrial activities within the residential communities. This cannot be denied when compared to the number of churches found in each street of the metropolis and the high output amplified public address systems they use. The use of these generators combine with high daily vehicular exhaust, domestic combustion, bush burning, industrial emission, gas flaring and construction works create an ancillary environmental problem of air pollution.

Table 5: Sources of noise within neighbourhood dwelling

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Automobiles	68	11	16	10	30	12	73	6	1	4	1	232	26
Electric Generator	133	27	65	70	58	30	88	10	8	4	8	501	56
Commercial	13	0	0	5	19	0	15	0	0	0	0	52	6
Religious	15	10	1	13	11	3	6	2	0	0	0	61	7
Social	25	0	4	0	8	0	7	0	0	0	1	45	5
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Perception on satisfaction with the noise level in the neighbourhood

Table 6 shows that majority of the respondents covering 64% were not satisfied with the noise level in their environment while 35% indicated satisfaction with the noise level in their environment, and 1% was undecided. It is revealed that apart from Orije (Old GRA), all the sampled neighbourhoods by aggregate were not satisfied with the noise level in their residential environments and this accounted for 64% of the negative continuum. This would transcend to mean that the noise levels in these areas are a major source of discomfort to the dwellers.

Table 6: Satisfaction with the noise level in the environment

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Yes	80	19	60	30	51	16	37	8	3	4	2	310	35.0
No	168	29	21	68	75	29	152	10	6	4	8	570	64.0
Undecided	6	0	5	0	0	0	0	0	0	0	0	11	1.0
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Level of awareness of adverse health effect of noise pollution

The analysis in Table 7 shows that majority of the population covering 73.6%% are not aware of the adverse health effect of noise pollution; 24.9% indicated that they are aware; while 1.5% maintained neutrality. This result agrees with the findings of Okeke and George (2015) who maintained that irrespective of the negative impacts of noise pollution in Port Harcourt metropolis, majority of the inhabitants have not recognized noise pollution as being that adverse to their health, but only considering it as a nuisance during sleeping hours. This among other reasons they blame on lack of adequate awareness of its effects on humans and dearth of data. This also expressed agreement with the findings of Orie (2016) in his thesis where he concluded that this lack of awareness of the impact of noise pollution on humankind and the environment is the cause of the absence of informed decisions and behaviours. However, Omubo-Pepple et al. (2010) added that even when information about the health effects of noise is available, it seems that much of the information is not appreciated by the medical community and even less so by the general public.

Table 7: Effects of noise pollution on health

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Yes	60	9	25	25	31	20	30	8	3	4	2	222	24.9
No	194	39	60	68	90	25	152	10	6	4	8	656	73.6
Undecided	0	0	1	0	5	0	7	0	0	0	0	13	1.5
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Level of awareness of any government regulations/laws on noise pollution

The findings in Table 8 showed that 75% of total respondents were not aware of any government regulations/laws on noise pollution; 23% expressed that they were aware of such regulations/laws; while 2% were undecided.

Table 8: Aware of any government regulations/laws on noise pollution

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Yes	45	10	40	20	31	10	30	8	3	4	2	203	23
No	201	38	46	78	92	35	155	9	6	4	7	671	75
Undecided	8	0	0	0	3	0	4	1	0	0	1	17	2
Total	254	48	86	98	126	45	189	18	9	8	10	891	100

Remedial actions taken against committers of noise pollution

The result in Table 9 reveals that majority of the respondents (814) representing 91.3% have never sought for remedy against committers of noise pollution within their residential neighbourhood; 39 of them covering 4.4% have taken remedial actions; while 38 of them accounting for 4.3% were neutral. This negligence in action against polluters may not be unconnected to the report of Orie (2016) which asserted that no specific (and comprehensive) law on the management of noise pollution is currently operational in Nigeria, thus, allowing states and enforcement agents to adopt ad hoc approaches to take care of the disparities and

other discernable lacunas.

Table 9: Remedy against committers of noise pollution environment

Community Responses	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	Total frequency	Percentage (%)
Yes	0	2	17	0	5	0	15	0	0	0	0	39	4.4
No	243	44	67	90	114	40	172	18	9	8	9	814	91.3
Undecided	11	2	2	8	7	5	2	0	0	0	1	38	4.3
TOTAL	254	48	86	98	126	45	189	18	9	8	10	891	100

Conclusion and Recommendations

It is evident that noise pollution was experienced in the residential neighbourhoods in Port Harcourt Metropolis with the highest mean noise in Elelenwo (70.1 dB(A)) and the major contributing factor was the use of generator sets. Also, on Sundays, the least noise level (65.3 dB(A)) was experienced while the highest was generated on Saturdays (66.0 dB(A)). The noise level was generally higher than the World Health Organisation (WHO) standard noise level for residential neighbourhoods. The study therefore showed that the residents in the residential neighbourhoods were not satisfied with the noise level. The study therefore recommended that there should be an overhaul of these fragmented regulations to engender more comprehensive and enforceable regulations and laws since existing regulations on noise pollution in Nigeria is concentrated on industrial sector and fraught with enforcement barriers. Also, massive enlightenment campaigns on the adverse effects of noise pollution should be regularly carried out by government and other institutional agencies.

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